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मानक

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IS 12082-1 (2006): Control of asbestos emission -
Recommendations, Part 1: Mining of asbestos ore [CED 53:
Cement Matrix Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
एस्बेस्टॉस उत्सर्जन का नियंत्रण — अनुशंसाएं
भाग 1 एस्बेस्टॉस अयस्क का खनन
(पहला पुनरीक्षण)

Indian Standard
CONTROL OF ASBESTOS
EMISSION — RECOMMENDATIONS
PART 1 MINING OF ASBESTOS ORE
(*First Revision*)

ICS 13.040.40

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FOREWORD

This Indian Standard (Part 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cement Matrix Products Sectional Committee had been approved by the Civil Engineering Division Council.

In recent years there has been a growing awareness that exposure to asbestos dust can have harmful effects on the health of workers. In order to give guidance on how the risk of exposure to asbestos dust can be prevented, controlled or minimized, it was felt necessary to lay down some standards regarding safe use of products containing asbestos, improving conditions in workplaces, preventive measures, protection and supervision of health of workers, packaging, transport and disposal of asbestos and asbestos waste, etc. This standard lays down the recommendations for control of emission of asbestos dust during mining of asbestos ore. The recommendations laid down in this standard are without any prejudice to the statutory provisions contained in the *Mines Act*, 1952 and the Rules and Regulations framed thereunder.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from 'ILO Code of practice: Safety in the use of asbestos, 1984' published by the International Labour Office, Geneva.

This revision is being brought out to incorporate the experience gained in the past during implementation of the earlier version. It has incorporated and elaborated various provisions in open cast mining and underground mining based on inputs from Mining Research Cell of Indian Bureau of Mines and from Central Mining Research Institute.

This standard is one of a series of Indian Standards on safety in handling and use of asbestos. Other standards in the series are as follows:

<i>IS No.</i>	<i>Title</i>
11450 : 1986	Method for determination of airborne asbestos fibre concentration in work environment by light microscopy (membrane filter method)
11451 : 1986	Recommendations for safety and health requirements relating to occupational exposure to asbestos
11767 : 1986	Recommendations for cleaning of premises and plants using asbestos fibres
11768 : 1986	Recommendations for disposal of asbestos waste material
11769	Guidelines for safe use of products containing asbestos:
(Part 1) : 1987	Asbestos cement products
(Part 2) : 1986	Friction materials
(Part 3) : 1986	Non-cement asbestos products other than friction materials
11770	Recommendations for control of emission of asbestos dust in premises manufacturing products containing asbestos:
(Part 1) : 1987	Asbestos cement products
(Part 2) : 1986	Friction materials
(Part 3) : 1987	Non-cement asbestos products other than friction materials
12078 : 1987	Recommendations for personal protection of workers engaged in handling asbestos

(Continued on third cover)

Indian Standard

CONTROL OF ASBESTOS EMISSION — RECOMMENDATIONS

PART 1 MINING OF ASBESTOS ORE

(First Revision)

1 SCOPE

This standard (Part 1) lays down the recommendations for control of asbestos dust emission during mining of asbestos ore.

2 REFERENCES

The standards listed below contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
11450 : 1986	Method of determination of airborne asbestos fibre concentration in work environment by light microscopy (membrane filter method)
11451 : 1986	Recommendations for safety and health requirements relating to occupational exposure to asbestos
11768 : 1986	Recommendations for disposal of asbestos waste material
12078 : 1987	Recommendations for personal protection of workers engaged in handling asbestos

3 OBJECT

The objectives of this standard are as follows:

- a) To prevent or minimize the potential for exposure to airborne asbestos dust during mining operations; and
- b) To reduce the probability of release of airborne asbestos dust into the environment.

4 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 11451 shall apply.

5 REQUIREMENTS

5.1 General

5.1.1 Every employer, who undertakes work that is liable to generate airborne asbestos dust, shall take adequate steps during mining, handling, processing and transportation of asbestos ore so as to eliminate or minimize the asbestos dust concentration in the working environment. To the extent possible automation and mechanization of mining operations is recommended.

5.1.2 No person shall enter or remain in any place suspected to contain certain airborne asbestos dust perceptible by sight or through monitoring or by other means, unless such person is wearing approved respiratory equipment to prevent the inhalation of such dust.

5.1.3 No person shall work in a place where asbestos dust in the air at any time may exceed permissible exposure limit measured through approved process and equipment and unless approved protective equipment is worn.

5.1.4 No person shall use compressed air for cleaning of clothes, body, and skip or truck in underground or in open cast working the foot wall of any slope or development end and blow out any hole or socket with compressed air, unless, the compressed air is applied together with water through a blow pipe approved for that purpose when the collar of the hole or socket is submerged under water.

5.1.5 An adequate supply of water shall be provided for dust suppression purposes. Such water shall be supplied in pipes not less than 25 mm in diameter at a working pressure of not less than 150 kPa when all sprays, jets and other appliances supplied from the same pipe are being operated.

5.2 Open Cast Mining

5.2.1 Dust generated by drilling operations shall be controlled by extraction equipment mounted on the drills.

5.2.2 Dust emissions from blasting shall be minimized by the use, wherever practicable, of multiple small blasts rather than one large blast.

5.2.2.1 The blasting faces, both on top and on sides, should be thoroughly wetted.

5.2.2.2 To reduce throw of the dust, control blasting techniques with proper spacing, burden and stemming along-with the delay elements and with deck loading, wherever possible, should be adopted.

5.2.2.3 To have heaving effect, only low density explosives should be used.

5.2.3 Roadways shall be regularly watered/wetted in order to reduce to a minimum the creation of asbestos dust.

5.2.4 To prevent spread of air borne fibre dust, a thick green barrier of minimum 10 m width with minimum of three rows of trees having fast growth and thick canopy should be provided surrounding the ultimate pit boundary and along the mining lease boundary enclosing therein the mining area, waste dump and processing plant, if any.

5.2.5 Whenever earth movement machines are used for extraction, thorough water spray should be provided for each machine under operation to reduce the generation of air-borne dust.

5.3 Underground Mining

5.3.1 Mining shall be carried out only when an adequate water supply is available.

5.3.2 Underground workplaces shall be kept wet continuously during work shifts.

5.3.3 The surface of every main travelling road underground shall be kept wet.

5.3.4 The exposed walls and broken ore pile shall be properly wetted before entering the area.

5.3.5 A well designed ventilation system shall be provided and operated at all times when the operations in the underground mines are continuing.

5.3.5.1 To reduce damage of fibre during the blasting operation, thus releasing air borne dust, each of the blasting face should be provided with initial free face, either by under-cut, top-cut or middle-cut within the non-asbestos mineralized zone. After this free face is developed, blasting within the asbestos mineralized zone should be done, as far as possible, with low-

density explosives. Where it is not possible to separate out this non-asbestos mineralized zone and the mineralization is uniformly distributed throughout, then dummy holes, without explosives, are to be provided to form a free face.

5.3.6 Where duct line is provided in the mine, openings at various points shall be at a level to maintain downward velocity of air into the duct opening to avoid inhalation of respirable dust.

5.3.6.1 To reduce damage of fibre during the blasting operation, thus releasing air borne dust, each of the blasting face should be provided with initial free face, either by under-cut, top-cut or middle-cut within the non-asbestos mineralized zone. After this free face is developed, blasting within the asbestos mineralized zone should be done, as far as possible, with low-density explosives. Where it is not possible to separate out this non-asbestos mineralized zone and the mineralization is uniformly distributed throughout, then dummy holes, without explosives, are to be provided to form a free face.

To have only a heaving effect over the *in-situ* rock, while charging the blast holes with explosives. 'Air decking' has to be provided by inserting inert material segment between the explosive column, like bamboo sticks. This helps an appropriate charge distribution, where better energy distribution is done, thus, reducing the generation of air borne fibre dust.

5.3.7 Appropriate transport velocity shall be maintained in the duct line to avoid settling down of the dust in the duct.

5.3.8 All underground dead ends shall be effectively ventilated by suitable means, such as auxiliary ventilation, partitioning of the gallery, etc.

5.3.9 Velocity of air in the main airways shall be so maintained that dust is not raised from the floor. It is recommended that the air velocity should be high enough to maintain:

- a) at least 19 percent O₂;
- b) less than 0.5 percent CO₂; and
- c) less than 33.5°C temperature, at any working place.

Where the wet bulb temperature exceeds 30.5°C, arrangement should be made to ventilate the same with a current of air moving at a speed of not less than 1 m/s. However, maximum velocity should be restricted to 4 m/s.

5.3.10 Following blasting, entry to the working space

shall be permitted only after sufficient time has been allowed for dust, smoke and fumes to be cleared by ventilation. The working of every part of a mine, where persons are required to travel or work, shall be properly ventilated to maintain safe and healthy environmental conditions for the workmen.

5.3.11 Mining mate responsible for making workings safe shall specifically ensure that the place is wetted and the visible dust is completely suppressed before allowing entry of other workmen. All miners shall wear appropriate respiratory equipments (*see* IS 12078).

5.3.12 In the workings of mine no person shall use any mechanical or manual means for ripping, picking, cutting, drilling or loading of or unless the necessary measures provided for dust suppression are operating in good working order.

5.3.13 The exhaust air coming out of the evasee of the main exhaust fan on the surface should be allowed to pass through wet scrubbers, before the air is released to the atmosphere.

5.3.14 To prevent the spread of air borne fibre dust, a thick green barrier with a minimum of three rows of trees species having fast growth with dense canopy of minimum width of 10 m, should be provided along the mining lease boundary enclosing therein the mining area, waste dump and processing plants, if any.

5.3.15 Pulsed infusion shot firing technique of blasting should be practiced to arrest dust right at the time of generation.

6 DUST MONITORING AND CONTROL

6.1 Asbestos dust shall be monitored during all

processes of mining, specially during drilling operation, in accordance with the recommendations given in IS 11450.

6.2 Recommendations given in IS 11451 shall be followed.

6.2.1 In every underground mine, irrespective of its depth, determinations shall be made once at least in every 30 days, of dust, temperature, humidity and such other environmental conditions as the Regional Inspector may, by order in writing, stipulate, at the blind end of every drivage and at such other points as the Regional Inspector may specify.

6.2.2 Dust suppression by water sprinklers should be carried out at loading and unloading points. Dust extractor should be used at loading and transfer points in case of conveyor transportation. Conveyor should be provided with leak proof cover which can be cleaned easily.

6.2.3 Possibility of the use of certain chemicals which are likely to suppress asbestos at floor, by spraying, so that dust is not raised by mining movements, may be explored.

7 DISPOSAL OF WASTE

All waste material shall be disposed off in accordance with the provisions laid down in IS 11768.

8 DRAINAGE AND PUMPING

Water being used extensively for dust suppression, an effective drainage and pumping system should be planned to control humidity in mines. Arrangements should be made to process and re-circulate water for dust suppression to minimize wastage/consumption of water.

(Continued from second cover)

<i>IS No.</i>	<i>Title</i>
12079 : 1987	Recommendations for packaging, transport and storage of asbestos
12080 : 1987	Recommendations for local exhaust ventilation systems in premises manufacturing products containing asbestos
12081	Recommendations for pictorial warning signs and precautionary notices for asbestos and products containing asbestos:
(Part 1) : 1987	Workplace
(Part 2) : 1987	Asbestos and its products
12082 (Part 2) : 2001	Control of asbestos emission — Recommendations milling of asbestos

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Amendments Issued Since Publication

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